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AUTHOR Pedrini, Bonnie C.; Pedrini, D. T.
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ABSTRACT

The paper presents a philosophy of education for severely deviant children and adolescents who are brain damaged (severely retarded), mentally ill, or behaviorally uncontrolled. The following are program components: psychologically and educationally sound materials such as programed materials following a life experience approach, operant conditioning procedures in a personal and social environment, and a structured classroom (limited to 15 students with one special education teacher and two trained teacher aides). The three components are compared to the legs of a stool, all of which are necessary if the stool is to stand. It is suggested that materials build upon past experiences so as to capitalize on student preferences for associative rather than cognitive learning. Explicitness is urged in programing, goal setting, and scheduling. The following principles of programed materials are identified as helpful: learn and be rewarded, learn in small steps, actively learn, learn with few or no errors, and learn at your own pace. Operant conditioning techniques are said to be important for gaining the control necessary for learning. The following aspects of F. Hewett's engineered classroom are discussed briefly: developmental sequence (attention, response, order, exploratory, social, mastery, achievement), learning triangle (task, reward, structure), classroom design, scheduling, and record keeping. (GW)

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THE EDUCATIONAL PHILOSOPHY OF THE THREE LEGGED STOOL: PSYCHOLOGICALLY AND EDUCATIONALLY SOUND MATERIALS OPERANT CONDITIONING PROCEDURES STRUCTURED CLASSROOM

Bonnie C. Pedrini and D. T. Pedrini

University of Nebraska at Omaha, Omaha, Nebraska 68101

Abstract

The educational philosophy presented in this paper is urgently needed for the teaching and training of severely deviant students. It is indebted to B. F. Skinner, who has inspired others to become behaviorists.

In addition to discussions, this paper includes select and separate bibliographies on history, on philosophy, and on procedures of operant conditioning. The latter bibliography includes many books especially cogent for classroom teachers.

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INTRODUCTION

As a totality, this paper deals with a philosophy of education for severely deviant children and adolescents. The phrase "severely deviant" is inclusive of several types of youth:

the markedly brain damaged (severely retarded)

the mentally ill (severely disturbed)

the behaviorally uncontrolled (severely acting-out youth)

Essentially, these severely deviant persons would not be in school if it were not for very-special, special-education programs. The phrase "severely deviant" is used for convenience. Eventually, many of these youth could be integrated (or re-integrated) into regular classrooms. Few students, in our opinion, should remain in special education classrooms. If all education would be special, few special education classrooms would be needed.

The philosophy of education advocated for severely deviant youth is analogous to a three legged stool. The three legs of the stool are: 1) psychologically and educationally sound materials, such as programmed materials following a life-experience approach, 2) operant conditioning procedures in a personal and social environment, and 3) a structured classroom, such as Hewett's (1968) Engineered classroom. All three legs are necessary for the stool to stand. If one or more legs are missing, the stool falls. The structured classroom (limited to 15 students with one special education teacher and two trained teacher aides) provides an environment conducive to learning. The high degree of structure and control is necessary for severely deviant youth, at least initially. Management and learning are enhanced. Operant conditioning procedures are directly applied to behavior to enhance adaptiveness, initially with

external controls, eventually with internal controls. The goals for severely deviant youth (compared to other youth) are more modest, are different essentially in degree rather than kind. Psychologically sound materials need to follow a life-experience approach for a youth so that learning relates to his (or her) life. In this way meaningfulness and relevance are built-in to the educational experience. Programmed instruction materials use principles especially conducive to new or early learning where positive reinforcements are especially needed.

The philosophy of the three legged stool is indebted primarily to the psychological and educational insights developed by Skinner (1938, 1948, 1953, 1957, 1968, 1969, 1971, 1972). He is dedicated to modern behaviorism and has inspired many students and colleagues (Dews, 1970).

PSYCHOLOGICALLY AND EDUCATIONALLY SOUND MATERIALS

The first leg of the stool comprises psychologically and educationally sound materials. Such materials are important for all students, but critically important for special education students and for the poor (so-called lower-lower class, so-called disadvantaged). Sound materials emphasize a life-experience approach (e.g., language-experience, Stauffer, 1969) especially when concerned with basic communication-arts (e.g., speaking, reading, writing, arithmetic). The materials used with special-education students and the poor have to build upon their past experiences much more than for other youth. Poor and special-education children use associative learning much more than cognitive learning. Abstractions are very difficult for them. They are programmed for such learning (Stauffer, 1969), but it takes much time and effort. The programming must be explicit rather than

implicit. Goals, schedules, contingencies need to be spelled out by the teacher and the student. Cognitive kinds of learning should be introduced when relative success is assured so as to enhance performance (so-called motivation). Resignation and feelings of worthlessness may be induced otherwise (and this seems to happen in the early grades, all too often, for special-education students and the poor). These students should not fail because we did not use psychologically and educationally sound materials.

The methods of presentation, of course, are varied. But, the principles underlying programmed materials are especially helpful in undertaking basic teaching-learning interactions. The main aspects of programmed materials are: 1) learn and be rewarded, 2) learn in small steps, 3) actively learn, 4) learn with few or no errors, and 5) learn at your own pace.

Research has shown that reward can be more effective than punishment in teaching because the latter may have emotion-inducing side effects which can block or inhibit learning. Reward is more effective if it immediately follows the response and if it is selective (given only when the correct or desired response is emitted).

Reward has its greatest effectiveness when given for right responses at each small step in the learning process. Learning is inefficient if each successive step is not mastered in turn--the material may become confusing and aversive. In programmed instruction, subject matter is broken down into many brief items. Each item helps lead the student from the simple toward the complex, requiring him (or her) to lean more and more on what he learned as he goes along.

Active participation is more effective than passive reception. The student will learn faster and remember longer if he is personally making the responses involved in the step-by-step process, and is personally receiving positive reinforcement for right responses.

Learning with few or no errors is conducive to further learning. Generally, a student learns better if he makes few errors. Making mistakes is time consuming and frustrating to the student in the learning situation. When a student makes many mistakes it means that one step doesn't lead logically to the next step or the steps in the process may be too large. The learning situation may become aversive to the student who is making errors,which often results in a decline of interest and activity.

Learning is best when a student generally proceeds at his own pace. In the classroom many students fall behind because they do not understand or misunderstand a point. In programmed learning, the lesson proceeds only if the student has completed a step and understands it.

OPERANT CONDITIONING

Operant conditioning is the second leg of the stool. Operant conditioning, derived from the descriptive behaviorism of Skinner is a technique that can be applied directly to the development of adaptive behavior. Such conditioning is important for all students, but critically important for special-education students and the poor (so-called lower-lower class, so-called disadvantaged). The teacher provides a favorable learning environment and at the same time arranges environmental factors to increase or decrease the frequency of certain responses. Behavior can be modified--"shaped" by applying principles of operant conditioning. One can gain development and control over relatively complex behavioral

sequences. One can posit or accelerate positive behavior and negate or decelerate negative behavior.

Operant conditioning applied to teaching deals with how to teach more than what to teach; it deals with methods more than materials. Behavior shaping applies the principles of learning--the psychology of learning to the teaching-learning situation. It is essentially the effective use of reward and punishment (or reward and non-reward) in a behavioral context. The use of reward and punishment certainly is not new, it is older than teaching itself. Teachers have been using these techniques for years. What is needed, however, is rigorous usage rather than on-again off-again applications. This kind of behavior modification is critically important for special education students and the poor. These students need the support of conditioning principles, applied systematically. They have difficulty in learning much school material unless they are positively reinforced, over and above the reinforcement inherent in sound materials. So what they need is not only psychologically and educationally sound materials in a life-experience approach, but operant conditioning procedures applied in their personal and social environment. The social environment is very important, programmed instruction materials, alone, will not suffice. The social environment must also enhance management and learning.

The modification of behavior implies control, the kind of control used in science. The word "control," however, has many negative connotations. Reese (1966, p. 62) states that

> Objections to the control of behavior usually express two fears: 1) that the methods of control will be aversive, and 2) that control will produce conformity.

> Ethical considerations aside, the behavioral evidence to date suggests that aversive forms of control are not the most effective forms over the long run. In addition, they generate escape and avoidance behavior which can turn into effective opposition.
>
> As for conformity, there is the possibility, as abhorrent to behaviorists as to anyone else, that the effective control of behavior could restrict the diversity of interests and actions that most of us now enjoy. We could, for example, decrease a person's behavioral repertoire by withholding reinforcement for various classes of responses or by removing the opportunity to emit these responses. But we can do just the opposite; we can enlarge a person's repertoire by making reinforcement contingent upon a greater variety of responses.

The effective control of behavior can do even more than this. Skinner (1965) offers the following alternative.

> It could well be that an effective technology of teaching will be unwisely used. It could destroy initiative and creativity, it could make men all alike (and not necessarily in being equally excellent), it could suppress the beneficial effects of accidents upon the development of the individual and upon the evolution of a culture. On the other hand, it could maximize the genetic endowment of each student, it could build the greatest diversity of interests, and it could lead him to make the greatest possible contribution to the survival and development of his culture.

The question is not one of control, per se. The pertinent question is how to use our increasing knowledge of behavior to best advantage. One way to improve education is to help teachers with curriculum methods and materials (as discussed in this paper). Another way is for teachers and students to share educational (Evans, 1968; Skinner, 1968) and social cultural (Fantini and Weinstein, 1968; Skinner, 1971) goals.

Operant conditioning eventually gives the student more freedom and lessens the need for the teacher to act as a disciplinarian. Rather, the teacher becomes a resource person and a programmer. The teacher then has

time to give special attention to each child's special deficits and assets.

The basic principles of operant conditioning are positive reinforcement, negative reinforcement, and punishment. Positive reinforcement, often called reward, occurs during or after the response and increases the probability that the response will occur again. The reward should be individualized, i.e., one must be assured that the reinforcer chosen is experienced as a reinforcer by the student. Initially, the reward should occur during or immediately after the desired behavior; the shorter the interval between the response and the reinforcer, the greater is the impact of the reinforcer. Eventually the reward may occur later, e.g., as shown by Homme (1970).

One often starts with continuous positive reinforcement until the desired response is dependable and reliable, then one converts to intermittent positive reinforcement. The latter, with high drive activities, is more resistant to extinction. And the problem of satiation is reduced. One can pair material and social reinforcers, although initially social reinforcers may not have as great an impact on severely deviant children.

Negative reinforcement, is aversive, occurs before or during the response and increases the probability that the response will occur again. Avoidance or escape procedures are examples of negative reinforcement. Generally, negative reinforcement is not as effective as positive reinforcement and may lead to rigidity behavior. Educators ought not to favor negative reinforcement, although we seem to be living in a society, culture, and world of negative reinforcement and punishment.

Punishment is aversive, occurs during or after the response and decreases the probability that the response will occur again. But, it is looked upon unfavorably by most educators. Mild punishment temporarily

suppresses a response but generally you have the same number of responses under extinction as you do prior to punishment. At first, punishment suppresses the response but then the response appears again. Punishment says "Don't do that!" but it does not tell the child what he (or she) should do. Punishment can yield negative emotions such as anger or fear. Punishment may lead to devious behavior.

STRUCTURED CLASSROOM

The third and final leg of the stool comprises a structured classroom. There are different structured classrooms but the best known is the engineered classroom of Hewett (1968). Generally the kind of structured classroom that we are referring to is limited to 15 students with one special education teacher and two trained teacher aides. This kind of classroom is important for special education students (and the poor?) but critically important for the severely deviant students (i.e., the markedly brain damaged, severely retarded; the mentally ill, severely disturbed; and the behaviorally uncontrolled, severely acting-out students).

In this kind of structured classroom, the materials used would be psychologically and educationally sound, following a life-experience approach, often using programmed instruction materials, in an operant conditioning personal and social environment. Some of Hewett's (1968, 1970) concepts such as developmental sequence, learning triangle, classroom design, scheduling, and record keeping are briefly discussed below.

The structured classroom would embody Hewett's (1968, 1970) concept of "developmental sequence" as a basis of its functioning. A child progresses through various sequential levels of development; at each level the child acquires competencies and behaviors which are necessary for him

to be successful in school. The underlying theme of the "developmental sequence" is that a child must be able to attend to a situation, respond to a situation, follow directions, explore his environment freely and with accuracy, and appropriately relate to others for learning to take place. Typically, these behaviors are acquired prior to school entrance; however, problem children usually have failed to master one or more of the sequential levels. Each of the following behaviors is considered a step in the "developmental sequence" (the behaviors are presented from lowest order to highest order): attention, response, order, exploratory, social, mastery, achievement.

The attention level involves getting the student to attend to his environment; the goal is to establish contact with the student and initiate learning. Tasks at this level may be categorized by reduced distractions, small discrete units, and concreteness (rather than abstractness). A few examples of attention tasks would be clearing the desk of clutter, tachistoscopic activities, and stories which focus on the here and now.

The response level is concerned with getting the student to respond to his surroundings; to insure continual responding the student must feel successful at the tasks he engages in. These tasks are characterized by success in learning. Realistic tasks (following a life-experience approach) are more conducive to learning. Examples are assignments which capitalize on the student's interests, and work in a study carrel which gives more privacy than a regular desk.

Order level tasks attempt to structure the learning situation; the tasks aim to help the student adapt to routine, follow directions, complete assignments, and control his behavior. Task characteristics at the order level include: maintaining a structured learning environment based on

fixed environmental expectation; defining a starting point, a series of steps, and an ending point which are scorable as to completeness (or incompleteness); requiring "student" behavior, e.g., requiring the student to get started quickly and work diligently. Tasks at this level might include secret code writing, or organizing cardboard strips with story pictures or words.

The exploratory level is concerned with applying the tools acquired at previous levels; the goal is to maintain the student's interest and provide him with intriguing information. The characteristics of exploratory level tasks are a wide range of multi-sensory experiences, an emphasis on reality, and predictable outcomes. Tasks at this level might be simple science experiments dealing with familiar materials; and art activities such as painting, clay modeling, drawing, and crafts.

The social level is also concerned with applying the tools acquired at previous levels; the goal is to help the student obtain the approval of others and to avoid their disapproval. The tasks characteristic at this level require that the student communicate with the teacher or one or more peers; maintain social behavior; and tolerate periods of delay, during which he must wait his turn.

At the mastery level, the student is programmed to attain: self-care enabling him to function independently in his environment; cognitive development in areas such as speech, concept formation, and problem solving; his expected achievement level in basic school subjects. The mastery level is a comprehensive level of attainment.

The achievement level attempts to foster an approach to learning rather than a specific competency. The following principles are suggested

to accomplish this goal: an enriching curriculum; student freedom in selecting learning tasks; encouraging creativity; stimulating critical thinking ability; strengthening study and reference skills; and increasing proficiency in such areas as power and speed reading. Of course, this level would be difficult for some students (including special education students and the poor) to achieve. Program for it.

The structured classroom would incorporate another basic ingredient of Hewett (1968, 1970), a "learning triangle." The triangle is based on what is necessary for learning to take place. The three sides of the triangle consider: 1, the task, 2, the reward, and 3, the structure.

For the student the task must be one which he is capable of doing and one which is relevant to his educational needs. For the student's efforts, a meaningful reward must be provided. A structure or control measure must be established which will allow and enhance the student's learning.

Many principles related to task(s) have been discussed in this paper in the materials (Psychologically and Educationally Sound Materials) section. Many principles related to reward(s) have been discussed in the methods (Operant Conditioning Procedures) section. Many principles related to structure(s) are being discussed in this, the classroom (Structured Classroom) section. Essentially, we are still dealing with materials, methods, and the classroom, but with very specific foci.

It is important to remember that the basic ingredient of a learning triangle has applicability not only for the student but for the teacher (and aides). The staff member's own experiences would profit from a learning triangle (task, reward, structure). For example, he (or she) needs to be positively reinforced, explicitly and implicitly. And the

triangle comes to fruition in a social, not just a personal environment. An interaction model is obvious.

The main structural idea borrowed from the engineered classroom (Hewett, 1968, 1970) is the room design, per se. Each child has his own desk, and all the desks are arranged in rows in the center of the room. Around the periphery of the room are various centers for different types of activities, e.g., art center, communication center, science center, order center, creativity center, reading center. Also on the periphery, would be individual study carrels. When possible, teaching machines and/or computer assisted instruction would be available at the study carrels.

Thus, large group, small group and individual seat-work, as well as out-of-seat work are available. Control areas, e.g., order center and individual study carrels are available. We also recommend a time-out area, where a student does not work explicitly for rewards but for self-control. When he re-achieves self-control, after a definitive period, he may once again work for rewards in a study carrel, activity center, or at his desk.

The daily schedule (e.g., Hewett, 1968, 1970) would be relatively set. The morning activities would include reading, arithmetic, other communication arts (e.g., printing or writing), and physical education. The developmental level of the task and student's behavior would determine where the activity would occur (desk, carrel, or center). If a student finishes his task successfully and early, he may then choose whatever educational activity (in a broad sense) he wants for the remainder of the allotted time. Each student is working at his own ability level and, therefore, even though many students may be engaged in reading activities, each student may be doing something entirely different.

Afternoon activities include science; art and craft; tutoring for the special needs of the individual student, e.g., speech therapy; and phasing some students back into the regular class. Afternoon activities tend to be more group oriented and more flexible than the morning activities, e.g., a current event might dictate the afternoon's activities. An example of a current event setting the stage for the other activities might be the death of a classroom pet. The students could draw pictures of what they liked best about the pet, they could have a funeral and bury him in a special place, etc. These activities should be planned by the students as much as possible with the teacher acting as a guide.

Students are phased back into the regular classroom as soon as possible, i.e., as soon as the deficits in his learning background have been eliminated and as soon as the student is able to work effectively in the regular classroom. Students are phased back into the regular class for a short period of time, initially. Gradually, the time periods get longer and longer. During the transition, he returns to the structured classroom (or a resource room) for special help. Eventually, the goal is to return as many special education students (including the severely deviant) as possible to a regular classroom, full time.

Behavioral interviews are conducted (e.g., Tharp and Wetzel, 1969) to determine needs and reinforcers. The staff's needs and reinforcers are important also. In interaction, the teacher and student report (written and/or oral) on specific goals distant and near-term, and means to these goals as Atkinson and McClelland have shown (e.g., Atkinson and Birch, 1970; McClelland and Steele, 1972).

Utilitarian record keeping (e.g., Hewett, 1968, 1970) is an important part of classroom activities. Attendance is taken in a structured

classroom for per diem cost analysis and possible reimbursement (from county, state, or federal units).

In the structured classroom advocated, there are no grades. A detailed record is kept of student work by the teacher and aides. The student also keeps a record of his work. The teacher fills out a progress report which lists the student's specific strengths and weaknesses and the specific ways he (or she) has improved in subject matter, personal-social functicning, and any special area particular to him (or her), e.g., speech therapy. Specific predetermined measures are used in behavioral analyses as bases for determing progress.

Reports are given by the teacher to the student (written and/or oral). The timing and format are extremely important and positive reinforcement should be emphasized. Reports are also given to groups and to the class.

Parent and teacher conferences are conducted to help the youth in his home as well as at school. An operant conditioner would be very helpful in such conferences for a severely deviant youth would be edified by a structured home-life as well as a structured school-life.

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